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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/788,863	02/27/2004	Joseph H. Sassine	I69.12-0600	7195

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EXAMINER	
WATKO, JULIE ANNE	

ART UNIT	PAPER NUMBER
2627	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/788,863	SASSINE ET AL.
	Examiner	**Art Unit**
	Julie Anne Watko	2627

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 5-12 14-16 18-20 26-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-12,14-16,18-20 and 26-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant is advised that the Notice of Allowance mailed 12/30/08 is vacated. If the issue fee has already been paid, applicant may request a refund or request that the fee be credited to a deposit account. However, applicant may wait until the application is either found allowable or held abandoned. If allowed, upon receipt of a new Notice of Allowance, applicant may request that the previously submitted issue fee be applied. If abandoned, applicant may request refund or credit to a specified Deposit Account.

Claim Objections

2. Claim 1 is objected to because of the following informalities: Claim 1 recites the limitation “the front end of the main beam section” in line 5. No “main beam section” has been previously recited. The Examiner suggests --the front end of the beam component-- for consistency with claim 1, line 2. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-3, 5-12, 14-16, 18-20 and 26-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arya et al (US Pat. No. 6785094 B2) in view of Sutton et al (US Pat. No. 5965249) and further in view of Takagi et al (US PAP No. 20010008475 A1).

As recited in claim 1, Arya et al show a head suspension assembly 100, comprising: a beam component 110 having a front end (right end in Fig. 6) and a rear end (left end in Fig. 6); a hinge component 108 near the rear end of the beam component 110 for connecting to an actuation arm 16; and a gimbal component 120 near the front end of the main beam section for carrying a transducing head 22; wherein the hinge component 108 comprises a first structural damping material (a laminate comprising 36 and 38) and the gimbal component 120 comprises a second structural damping material (a laminate comprising 36 and 38).

As recited in claim 1, Arya et al are silent regarding the 1st structural damping material having a modulus of elasticity greater than approximately 10 gigapascals and a damping capacity greater than approximately 0.02, and the 2nd structural damping material having a modulus of elasticity greater than approximately 10 gigapascals and a damping capacity greater than approximately 0.02.

As recited in claim 1, Sutton et al show structural damping materials for use in disk drive suspensions ("In addition to damping vibrations related to noise, better damping materials could also be used to improve disk drive read/write performance,

provide a more robust design, and also increase drive reliability by damping vibrations that affect component performance. Locations for such dampers include, but are not limited to the arm/suspension (17) …. For example, the damping material can be optimized to reduce the effect of mechanical resonances in the head actuator .... These resonances are known to limit stability of the control loop and thereby result in a reduction of operational bandwidth for the head or spindle system. Reduction of resonance effects can thereby improve response time for the drive's subsystems", see col. 12, line 62-col. 13, line 11, especially col. 12, lines 66-67), said materials having a damping capacity greater than approximately 0.02 (see, e.g., Fig. 19). Furthermore, Sutton et al disclose structural damping materials having a modulus of elasticity greater than approximately 10 gigapascals (see, e.g., Fig. 18). Moreover, Sutton et al teach that "materials are needed with improved dynamic loss moduli and sufficient tan δ" (see col. 4, lines 12-13), wherein "all references to dynamic loss and storage moduli will refer to Young's Moduli" (see col. 2, lines 5-6).

Additionally, the law is replete with cases in which when the mere difference between the claimed invention and the prior art is some range, variable or other numeric limitation within the claims, patentability cannot be found.

It furthermore has been held in such a situation, the Applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Moreover, Sutton et al's disclosure of structural damping materials having damping capacities and moduli of elasticity within the claimed ranges is evidence that the claimed ranges were within the level of ordinary skill in the art at the time of Applicant's disclosure. Additionally, increasing damping capacities and moduli of elasticity is presumed to have been predictable at the time of Applicant's disclosure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrive at the claimed numeric range in the course of routine experimentation and optimization. The rationale is as follows: one of ordinary skill in the art would have been motivated to conform to the dictates of the disk drive suspension application by achieving sufficient damping, reducing sound output, while avoiding affecting system response/performance by achieving low mass components which will not adversely affect the momentum of the head, so as to avoid performance problems by generally improving damping performance, as well as by tailoring to the acoustic resonance of a particular disk drive, thus improving read/write performance, providing a more robust design, and also increasing drive reliability by damping vibrations that affect component performance, stabilizing the control loop and improving operational bandwidth for the head system, improving response time by optimizing the damping to reduce the effect of mechanical resonances in the head actuator as taught by Sutton et al (see col. 2, lines 7-8, "The specific properties a damping material must possess are dictated by the constraints of typical applications."; see also col. 2, lines 17-21, "and in situations where the addition of damping components adds undesired mass affecting system response/performance (damping of vibrations in disk drive read/write heads, for

example, requires low mass components which will not adversely affect the momentum of the head).”; see also col. 12, line 15-col. 13, line 11, “Within the magnetic drives commonly used in computers, dampers are often used in many locations to damp vibrations that either cause performance problems or acoustical concerns. ... Beyond generally improved damping performance, the materials of this invention provide added utility over currently available materials because of their ability to be tailored to the acoustic resonance of a particular disk drive. Such resonant modes can vary between different drive designs due to choices in the spindle motor assembly, head actuation, etc., and the ability to tailor peak performance of the damper could greatly reduce sound output. … better damping materials could also be used to improve disk drive read/write performance, provide a more robust design, and also increase drive reliability by damping vibrations that affect component performance. Locations for such dampers include, but are not limited to the arm/suspension (17) …. the improved damping performance would add utility in each situation. For example, the damping material can be optimized to reduce the effect of mechanical resonances in the head actuator or spindle system. These resonances are known to limit stability of the control loop and thereby result in a reduction of operational bandwidth for the head or spindle system. Reduction of resonance effects can thereby improve response time for the drive's subsystems.”).

As recited in claim 1, Arya et al are silent regarding at least one of the hinge component and the gimbal component is separately made and attached to the beam component

As recited in claim 1, Takagi et al teach many advantages of making at least one of a hinge component and a gimbal component separately and attaching to a beam component. In a suspension formed by partial etching, “Since the thickness of the spring portion cannot be accurately controlled by partial etching, however, it is unstable, so that the spring constant is liable to variation”. See ¶ 0011. When the hinge and beam are separately formed and joined, the need for etching is reduced, so that “the spring portion can enjoy a steady low spring constant”. See ¶ 0018. Furthermore, when separately forming the hinge and beam components, “suitable materials, thicknesses, etc. may be selected individually for the rigid body portion and the spring portion.” See ¶ 0015. This appropriate selection of thicknesses and materials reduces the need for bent edges and ribs to increase stiffness of the beam component, "therefore, the load beam 31 can be shaped so that it cannot easily disturb a flow of air, and stiffness of the load beam is enhanced. Thus, the influence of air turbulence is lessened". See ¶ 0048. “Since the rigid body portion of the load beam and the spring portion are separate components, the rigid body portion can be formed of a material softer than that of the spring portion. Thus, the rigid body portion can be formed with a higher degree of freedom of work, such as pressing.” See ¶ 0018.

Moreover, separate formation of suspension components is presumed to have been predictable at the time of Applicant’s disclosure. Additionally, attachment of suspension components is presumed to have been predictable at the time of Applicant’s disclosure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to separately make at least one of the hinge component and the gimbal component and attach it to the beam component of Arya et al as taught by Takagi et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to stably control the spring constant of the hinge component by reducing a need for etching, to individually select suitable materials and thicknesses of the hinge component and the beam component so as to provide appropriate rigidity and elasticity while lessening an influence of air turbulence, and to provide greater freedom of work as taught by Takagi et al (see ¶ 0011, 0015, 0018 and 0048).

As recited in claim 2, Arya et al are silent regarding whether the first structural damping material has a modulus of elasticity greater than approximately 30 gigapascals, and the second structural damping material has a modulus of elasticity greater than approximately 30 gigapascals.

As recited in claim 2, Sutton et al show structural damping materials having modulus of elasticity greater than approximately 30 GPa (see especially Fig. 26, wherein 30 GPa = $3 \cdot 10^{11}$ dyne/cm^2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrive at the claimed ranges in the course of routine experimentation and optimization of the suspension of Arya et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to achieve sufficient damping capacity across the various frequency bands important for disk drive suspensions as taught by Sutton et al (see col. 4, lines 10-19).

As recited in claims 3 and 20, Arya et al show that the first structural damping material and the second structural damping material are substantially identical in composition (insofar as both consist of the 3rd, 4th and 5th layers (36, 38 and 40, respectively) of Arya et al).

As recited in claim 5, Arya et al show that the hinge component 108 applies a preload ("hinge enables the load beam to suspend and load the slider and the read/write head toward the spinning disk surface", see col. 1, lines 32-34) on the transducing head (see 22 and 20) through the beam component 110.

As recited in claim 6, Arya et al show that the entire hinge component 108 is substantially made from the first structural damping material (3rd + 4th + 5th layers laminated together) only.

As recited in claim 7, Arya et al show that the entire gimbal component 120 is substantially made from the second structural damping material (3rd + 4th + 5th layers laminated together) only.

As recited in claim 8, Arya et al show that the hinge component 108 has no external structural damping material attached thereto (see Fig. 6).

As recited in claim 9, Arya et al are silent regarding whether the first structural damping material has a modulus of elasticity greater than approximately 50 gigapascals.

As recited in claim 9, Sutton et al show a structural damping material having a modulus of elasticity greater than approximately 50 gigapascals (see Fig. 26, for example).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to arrive at the claimed range in the course of routine experimentation and optimization of the suspension of Arya et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to achieve sufficient damping capacity across the various frequency bands important for disk drive suspensions as taught by Sutton et al (see col. 4, lines 10-19).

As recited in claim 10, Arya et al are silent regarding whether the second structural damping material has a modulus of elasticity greater than approximately 50 gigapascals.

See teachings, rationale and motivations above for claim 9.

As recited in claims 11 and 18, Arya et al show that the first structural damping material is an alloy (insofar as it comprises the steel 3rd layer 36).

As recited in claim 12, Arya et al show that the first structural damping material is a laminate comprising a stainless steel layer (3^{rd} layer 36) and a damping material layer (4^{th} layer 38).

As recited in claim 14, Arya et al are silent regarding whether the at least one of the hinge component and the gimbal component is attached to the beam component through an adhesive.

As recited in claim 14, Takagi et al show that the hinge component is attached to the beam component through an adhesive (see ¶ 0045).

Moreover, the use of adhesive is presumed to have been predictable at the time of Applicant's disclosure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select among the finite number of known, predictable attachment methods disclosed by Takagi et al when applying the separate formation and attachment teachings of Takagi et al to the suspension of Arya et al. The rationale is as follows: one of ordinary skill in the art would have had reason to explore the finite number of known options rather than to rely upon an unknown or unpredictable attachment method as is notoriously well known in the art.

As recited in claim 15, Arya et al are silent regarding whether the at least one of the hinge component and the gimbal component is attached to the beam component through welding.

As recited in claim 15, Takagi et al show that the at least one of the hinge component and the gimbal component is attached to the beam component through welding (see ¶ 0044).

Moreover, the use of welding is presumed to have been predictable at the time of Applicant's disclosure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select among the finite number of known, predictable attachment methods disclosed by Takagi et al when applying the separate formation and attachment teachings of Takagi et al to the suspension of Arya et al. The rationale is as follows: one of ordinary skill in the art would have had reason to explore the finite number of known options rather than to rely upon an unknown or unpredictable attachment method as is notoriously well known in the art.

As recited in claim 16, Arya et al show a head suspension assembly 100, comprising: a beam component 110 having a front end (right end in Fig. 6) and a rear end (left end in Fig. 6); a hinge component 108 for connecting to an actuation arm, wherein the hinge component 108 consists essentially of a first structural damping material; and a gimbal component near the front end of the beam component for connecting to a slider assembly carrying a transducer.

As recited in claim 16, Arya et al are silent regarding first structural damping material having a modulus of elasticity greater than approximately 10 gigapascals and a damping capacity greater than approximately 0.02.

See teachings and rationale above for claim 1.

As recited in claim 16, Arya et al are silent regarding whether the hinge component is separately made and attached to the rear end of the beam component.

See teachings and rationale above for claim 1.

As recited in claim 19, Arya et al are silent regarding whether the gimbal component comprises a second structural damping material having a modulus of elasticity greater than approximately 10 gigapascals and a damping capacity greater than approximately 0.02.

See teachings and rationale above for claim 1.

As recited in claims 26 and 28, Arya et al are silent regarding whether the first structural damping material is a composite.

As recited in claims 26 and 28, Sutton et al teach the use of composite (see Figs. 1-2) structural damping materials (see col. 4, line 33-col. 5, line 17) in disk drive suspensions (see col. 12, lines 66-67).

Moreover, the use of a composite is presumed to have been predictable at the time of Applicant's disclosure.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the composite material of Sutton et al in the suspension of Arya et al as taught by Sutton et al. The rationale is as follows: one of ordinary skill in the art would have been motivated to achieve sufficient mechanical strength and integrity to provide good performance characteristics, including structural integrity in a suspension where damping is required in conjunction with long term mechanical integrity as taught by Sutton et al (see col. 5, lines 12-17).

As recited in claim 27, Arya et al show that the first structural damping material is a laminate comprising a stainless steel layer 36 ("The third layer is intended to function as the principal load bearing layer of a flexure. It is thus preferably made from a material selected from the group consisting of structural load bearing materials, including but not limited to stainless steel and copper.", see col. 5, lines 24-28) and a damping material layer 38 ("The fourth layer is intended to function as a flexure insulative layer and/or a damping layer. It is thus preferably made from a material selected from the group consisting of electrically insulating materials and damping materials, including but not limited to polyimides and viscoelastic polymers.", see col. 5, lines 28-33).

As recited in claim 29, Arya et al show that the first structural damping material is an alloy (insofar as it comprises the steel 3rd layer 36).

As recited in claim 30, Arya et al show that the second structural damping material is a laminate comprising a stainless steel layer (3^{rd} layer 36) and a damping material layer (4^{th} layer 38).

As recited in claim 31, Arya et al are silent regarding whether the second structural damping material is a composite.

See teachings and rationale above for claims 26 and 28.

As recited in claim 32, Arya et al show that the second structural damping material is an alloy (insofar as it comprises the steel 3rd layer 36).

Response to Arguments

6. Applicant's arguments with respect to claims 1-3, 5-12, 14-16, 18-20 and 26-32 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julie Anne Watko whose telephone number is (571) 272-7597. The examiner can normally be reached on Mon & Fri, 9:30AM to 6:30PM, Tues-Thurs after 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrea L. Wellington can be reached on (571) 272-4483. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

/Julie Anne Watko/
Primary Examiner, Art Unit 2627

08/28/2009
JAW